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REVISION OF THE NEARCTIC GENUS *PHILTRAEA* HULST,

WITH NOTES ON BIOLOGY AND THE DESCRIPTIONS OF NEW SPECIES (GEOMETRIDAE)

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THE PRESENT WORK WAS BEGUN late in 1965 after discussing the apparent confusion within the genus with colleagues Mr. Carl Kirkwood and Dr. Jerry Powell. Through the study of genitalic mounts of both sexes of a number of disjunct populations, it was found that many previously unrecognized species existed within *Philtraea* Hulst. The scope of this revision is to make available names for the undescribed entities as well as to provide previously unrecorded information pertaining to morphology, life histories and distribution. Descriptions, keys ,distribution maps, illustrations and pertinent discussion are included where thought to be of value.

The presently recognized species within the genus are:

1) *Philtraea elegantaria* (Henry Edwards)
2) *P. utahensis* n. sp.
3) *P. surcaliforniae* n. sp.
4) *P. latifoliae* n. sp.
5) *P. mexicana* n. sp.
6) *P. albimaxima* n. sp.
7) *P. paucimacula* Barnes & McDunnough
8) *P. monillata* n. sp.

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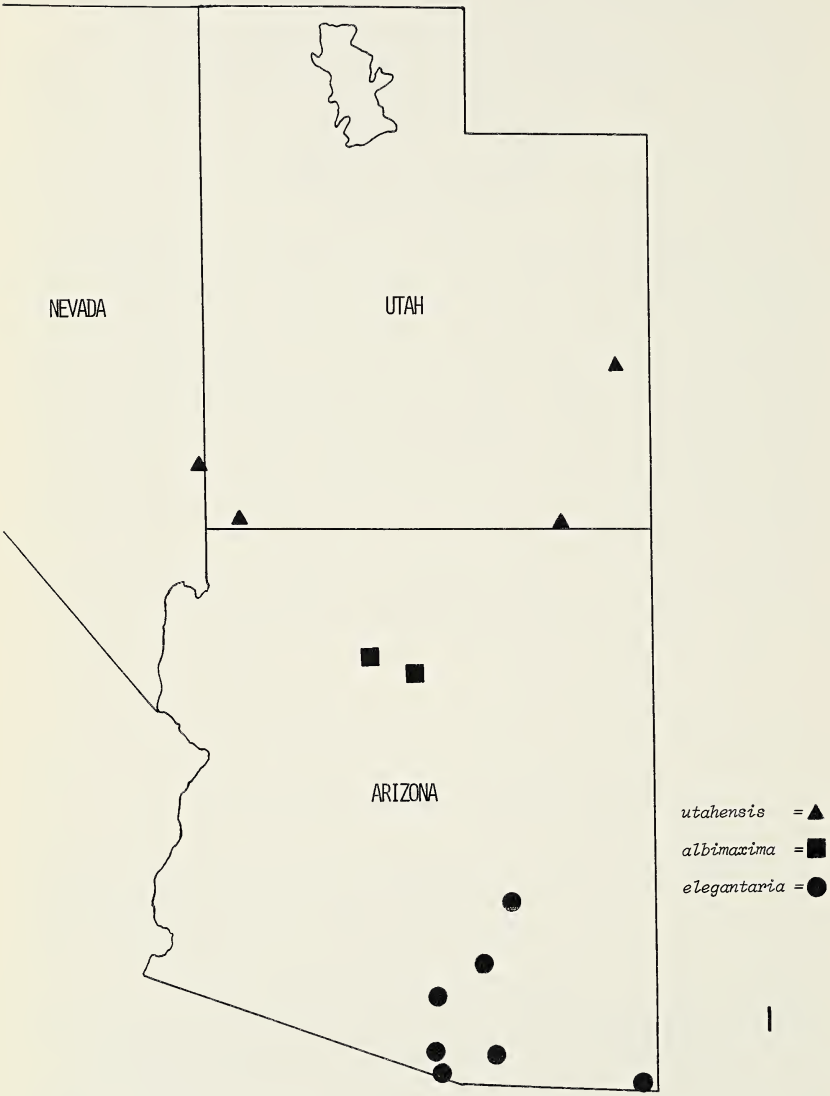


Fig. 1.—Distribution map depicting the known range of *Philtraea elegantaria* (Hy. Edw.), *P. albimaxima* Bkt., and *P. utahensis* Bkt.

The author presently recognizes three species groups within *Philtraea,* the most obvious diagnostic feature used to define these groups being the shape of the juxta of the male genitalia and the shape of the ductus seminalis of the female genitalia. Superficially, the adults are somewhat similar interspecifically, and share the same dorsal ground color of the primaries, which is white, and to a lesser degree, the two transverse gold colored bars also found on the dorsal surface of the primaries.

The genus *Philtraea* was first proposed by Hulst (1896) for the species *elegantaria* (Hy. Edw.). At the time of the original description of *elegantaria,* Edwards had placed this species in the genus *Zerene* Hubner, close "to the well known *catenaria.*" *Zerene* is presently applied to a subgenus of butterflies, and the species *catenaria* Drury is presently in the genus *Cingilia* Walker. Barnes and McDunnough (1918) described *paucimacula,* a new variety of *elegantaria,* and placed it also in the genus *Philtraea,* thus bringing the total of named entities within the genus up to two. Until this present work, *elegantaria* and *paucimacula* have been the only described entities within *Philtraea.*

To date some information has been accumulated pertaining to the immature stages of members within the genus, but considering the group as a whole, much work has yet to be done. The reliability of some of the hostplant data may be questionable, as they were taken from labels affixed to specimens. Larvae of *P. latifoliae* n. sp. have been personally collected on Oregon Ash (*Fraxinus latifolia* Benth.) and reared to adulthood by Mr. A. Noel McFarland. A description of the larva can be found under the elaboration in the descriptive section pertaining to *P. latifoliae.*

Other indications of hostplants from labels read "bd. privet," or "on weeds." The latter reference to "weeds" indicates that perhaps *paucimacula* at least, may be an herbaceous feeder on one or more smaller plant species. Still another species, *monillata* n. sp. apparently feeds on "privet" in the larval stage of the first generation, whereas information is lacking for the second, or late summer generation of this species. However, it would most likely still feed on "privet".

The pupae of *Philtraea* are brightly colored in instances where they have been observed. The ground color is predominently white, with some yellowish coloration and overlain with black flecks. In *latifoliae,* the pupa is enclosed in a

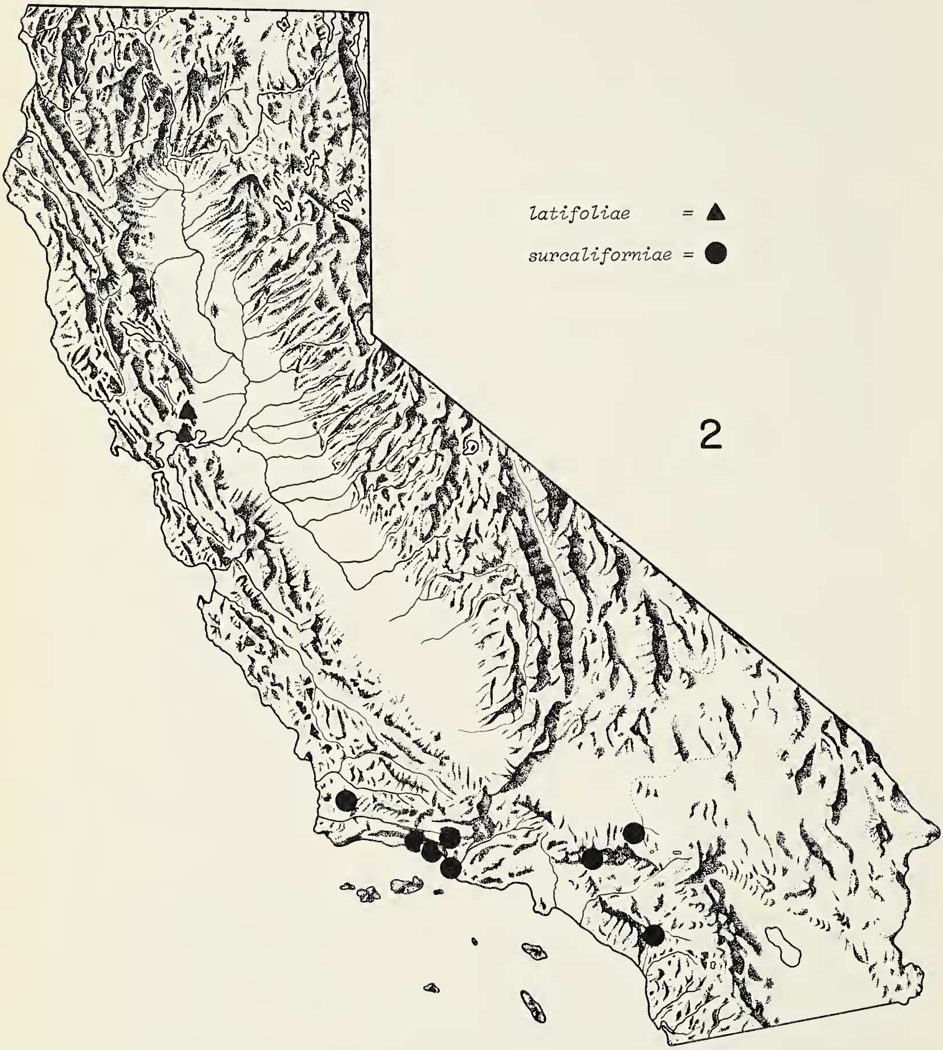


Fig. 2.—Distribution map depicting the known range of *P. latifoliae* Bkt.; the known range of *P. surcaliforniae* Bkt. is complete except for omission of the single record from La Paz, Baja California, Sur, Mexico (mentioned in "Specimens examined" section for this species).

"weak cocoon," or an "open net," and is easily seen through this netting (see fig. 21). It is probable that other species within the genus also exhibit this same construction pattern.

To my knowledge, the literature pertaining to *Philtraea* does not reveal any known predators or parasites.

The known distribution of *Philtraea* indicates that the genus is confined to the Nearctic, with most of the species occurring in the area of the southern United States. In general, the species within the genus are found between 85° longitude to 124° longitude, and 25° north latitude to 38° north latitude. In California, *surcaliforniae* n. sp. has been collected at sea level, and *mexicana* n. sp. has been collected at an elevation of 7,500 feet in Chihuahua, Mexico (see distribution map, fig. 3).

Philtraea Hulst

TYPE: *Zerene elegantaria* Henry Edwards, 1881. Papilio 1:121.

Philtraea Hulst, 1896. Trans. American Entomol. Soc. 23:364-365; Dyar, 1903 (1902), Bull. U.S. Nat. Mus., No. 52:331; Barnes and McDunnough, 1917, Check list of the Lepidoptera of Boreal America, p. 119; 1918, Contrib. Nat. Hist. Lep. of N. America 4(2):154 + pl. 20, figs. 2 and 3; Comstock, J. A., 1934, Bull. of S. Calif. Acad. Sci. 33(1):35-36 + pls. 16 and 17; McDunnough, 1938, Mem. S. Calif. Acad. Sci. 1:170.

Head: Antennae in both sexes bipectinate, bipectinations in male longer than in female; frons with integument roughened, or more or less smooth, clothed in whitish, yellowish or golden scales and elongate hairs; maxillary palpi rudimentary; proboscis vestigial in male, in female small, nearly rudimentary. Thorax with collar and tegulae clothed in white elongate scales and hairs; posterior marginal fold of alinotum of mesothorax greatly pronounced so as to transversely divide vestiture between meso and metathorax; primaries in male lacking fovae, ventrally clothed in white scales and elongate hairs; legs normal, meso and meta-tibiae each possessing a pair of end spurs; venation of wings generalized as in figs. 31 and 32. Abdomen clothed in predominence of white scales. Greatest expanse of forewing varies from 9 mm to 22+ mm. Genitalia as in illustrations.

Philtraea seems best placed at, or near where it was placed by McDunnough (1938) in his check list. By genitalia *Philtraea* exhibits the same general type as does *Plataea* Herrich-Schaeffer, *Enypia* Hulst, and *Nepytia* Hulst. By maculation of the primaries, *Philtraea* stands as a unique genus in the Nearctic Ennominae.

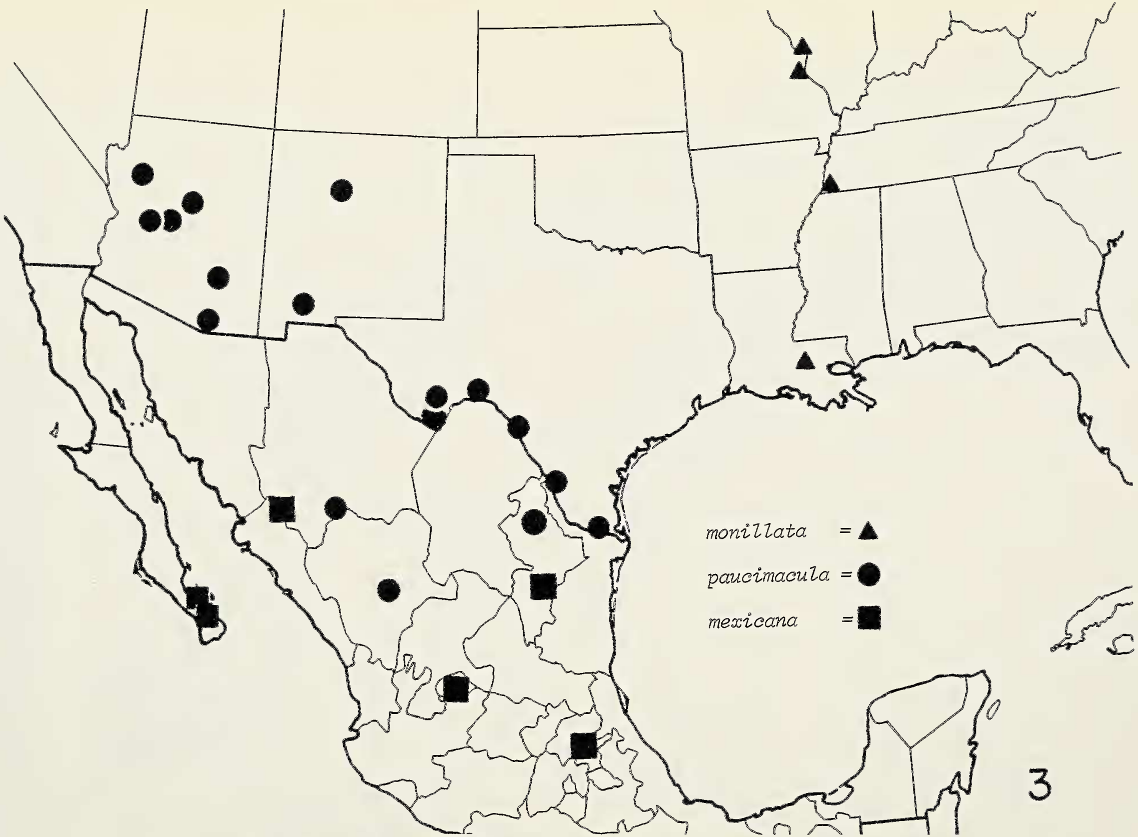


Fig. 3.—Distribution map depicting the known range of *P. monillata* Bkt., *P. paucimacula* B. & McD., and *P. mexicana* Bkt.

Keys to species of *Philtraea* by use of color and maculation

1. Ventral surface of primaries dusky to fuscous in male; dorsal surface of primaries not possessing much yellow between geminate transverse anterior and transverse posterior lines, or if yellow is easily discernible, then much black coloration accompanying lines 2

   Ventral surface of primaries whitish, or if slightly dusky, dorsal surface with transverse anterior and transverse posterior lines possessing much yellow, usually lacking prominent black coloration of lines 3

2. Greatest expanse of forewing 20mm or greater; dorsal surface of primaries with ground color whitish, little yellow between geminate transverse anterior and transverse posterior lines; ventral surface of primaries dusky, not fuscous; secondaries dorsally whitish, lacking prominent black dots (which form disjunct exterior line); known to occur in Arizona and Mexico 6

   Greatest expanse of forewing 19mm, averaging less than 18mm; dorsal surface of primaries with very distinct markings, transverse anterior and transverse posterior lines geminate, filled with bright yellowish; secondaries with black dots forming disjunct exterior line (more prominent in males than in females); ventral surface of primaries fuscous; known to occur in northern California .... *latifoliae,* n. sp.

3. Greatest expanse of forewing 20mm; distance between junction of tranverse anterior and transverse posterior lines on inner margin proportionately greater than in remaining species (as in fig. 9); "U" shaped geminate line between transverse anterior and transverse posterior lines broadly open costally; known to occur in Southern California .... *surcaliforniae,* n. sp.

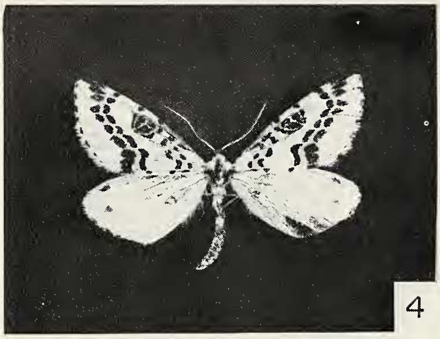
   Greatest expanse of forewing variable, from 10mm to 18mm, but seldom does a specimen exceed 18mm in this measurement; distance between transverse anterior and transverse posterior lines on inner margin proportionately less than in *surcaliforniae;* "O" or "U" shaped geminate line between transverse anterior and transverse posterior lines closed (to form a circle), or narrowly open costally (as in fig. 4); species known to occur in the southern United States, but not thus far in California 4

4. Dorsal surface of primaries with transverse anterior and transverse posterior lines geminate, much black coloration to lines (as in fig. 4); very prominent maculation; greatest expanse of forewing averaging nearly 16mm, little size variation (with the exception of an occasional runt); known to occur in Arizona; genitalia as in figs. 24, 33 and 41. .... *elegantaria* (Hy. Edw.)

   Dorsal surface of primaries with transverse anterior and transverse posterior lines geminate, but black coloration not as prominent as in preceding (e.g. figs. 5, 6 and 15); yellow inner filling of transverse anterior and transverse posterior lines prominent or maculation may be greatly reduced; greatest expanse of forewing from 10mm to 18mm 5

5. Primaries with "U" shaped mark at costa between transverse anterior and transverse posterior lines; transverse lines of primaries yellow, not too prominent, little black bordering these lines; genitalia as in figs. 22, 34 and 42. ....*utahensis* n. sp.

   Primaries with "O" or "U" shaped mark on costa; transverse lines of primaries very conspicuously yellow; male genitalia as in figs. 28, 29, 30, 38, 39. 7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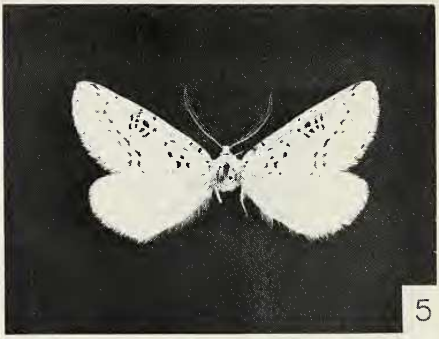
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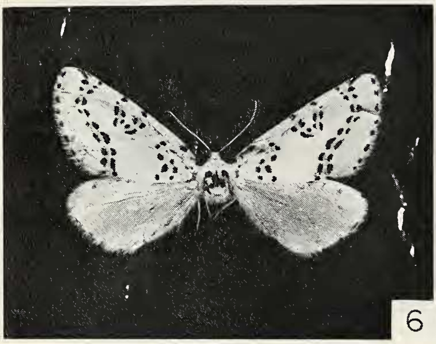
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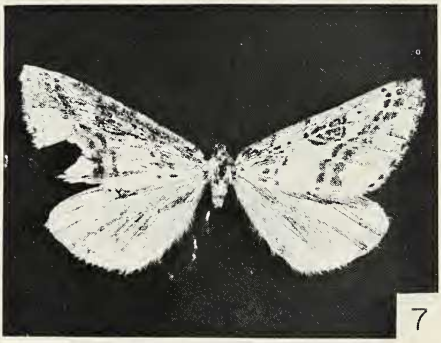
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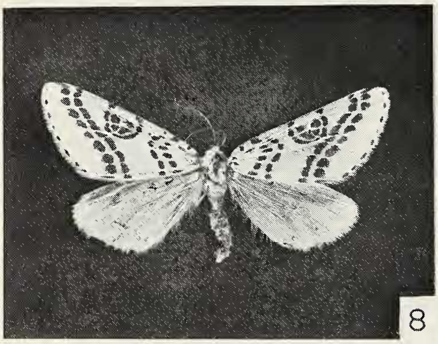
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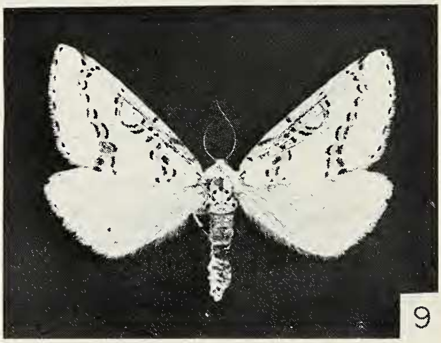
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Fig. 4.—*Philtraea elegantaria* (Hy. Edw.), male. ARIZONA: Baboquivari Mountains, 26 April 1958 (G.H. & J.L. Sperry). Fig. 5.—*P. utahensis* Bkt., holotype male. UTAH: St. George, Washington County, June, (slide no. 4615, F.H. Rindge). Fig. 6.—*P. utahensis,* allotype female (abdomen missing). Same data as holotype. Fig. 7.—*P. mexicana* Bkt., holotype male. MEXICO: no further data, (R. Muller), Bauer-Buckett slide no. 67D10-21. Fig. 8.—*P. mexicana,* allotype female. MEXICO: 3 miles east of Galeana, Nuevo Leon, 7-9 August 1963, 5,000 ft. elevation (W.D. Duckworth and D.R. Davis). Fig. 9.—*P. surcaliforniae* Bkt., paratype female. CALIFORNIA: San Marcos Pass, north of Santa Barbara, Santa Barbara County, 4 July 1965 (J.S. Buckett).

6. Ventral surface of primaries in male conspicuously dusky; transverse anterior and transverse posterior lines on primaries not prominent; "O" or "U" shaped mark between transverse anterior and transverse posterior lines nearly wanting; known to occur in Arizona. .... *albimaxima* n. sp.
   Ventral surface of primaries in male off white in color, but not conspicuously dusky; transverse anterior and transverse posterior lines prominent; "U" shaped mark prominent; thus far found on the plateau and western portions of Mexico. ....*mexicana* n. sp.

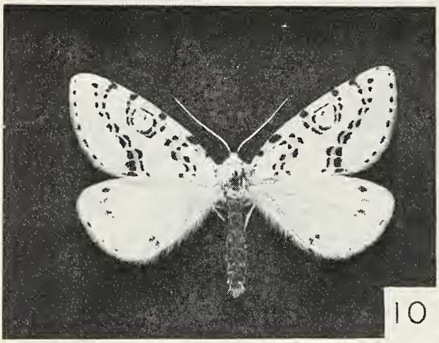
7. Transverse lines of primaries very broad (as in figs. 16, 17 and 18); species exhibiting apparent bivoltinism, the second brood with specimens diminutive in size; known to occur along the Mississippi River (see fig. 3); genitalia as in figs. 30, 39 and 48. .... *monillata* n. sp.
   Transverse lines of primaries much narrower (as in figs. 14 and 15); little evidence of bivoltinism (one record seen which might indicate second brood); widespread from Arizona eastward into Texas and south into northern Mexico; may exhibit a pale form with maculation nearly wanting; genitalia as in figs. 28, 29, 38 and 47. .... *paucimaculata* Barnes and McDunnough

Philtraea elegantaria (Henry Edwards)
(Figs. 1, 4, 19, 24, 31, 32, 33, 41)

Zerene elegantaria Henry Edwards, 1881, Papilio 1:121.

Philtraea elegantaria, G. D. Hulst, 1896, Trans. American Entomol. Soc. 23:364-365; Dyar, 1903 (1902), Bull. U. S. Nat. Mus., No. 52:331; Barnes & McDunnough, 1917, Check list of the Lepidoptera of Boreal America, pg. 119; Comstock, J. A., 1934, Bull. S. Calif. Acad. Sci. 33(1):35-36 + pls. 16 and 17; McDunnough, 1938, Mem. S. Calif. Acad. Sci. 1:170.

Male: Ground color of primaries white; maculation prominent; transverse lines with considerable amount of dark scalation. Head with vertex clothed in whitish and yellowish elongate hairs, yellowish ones being nearest frons; frons clothed with white scales and yellowish elongate hairs, integument roughened, granulated; palpi diminutive, slightly upturned, clothed in white hairs, ventrally clothed sparsely in elongate white hairs; proboscis vestigial; compound eyes very large, conspicuous; antennae heavily bipectinate, each pectination possessing minute setae, scape and pedicel clothed in white scales, as is dorsal portion of antennae. Thorax dorsally with divided collar composed of white elongate scales and elongate hairs; tegulae clothed basally in yellowish scales and hairs, clothed terminally in elongate white hairs; disc composed of white and yellow scales, but may appear either yellowish or whitish to the unaided eye, ventrally clothed in whitish scales and hairs (easily rubbed off), as are legs; primaries dorsally with ground color white; basal line suggested costally by dark brown dash (this



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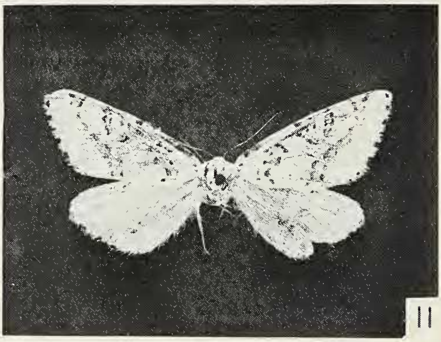

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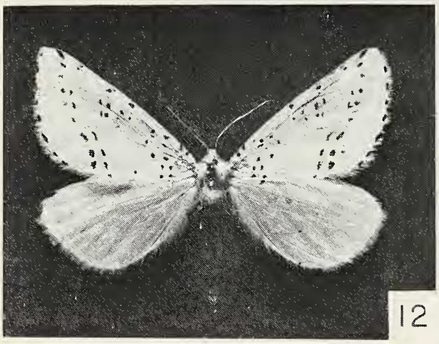

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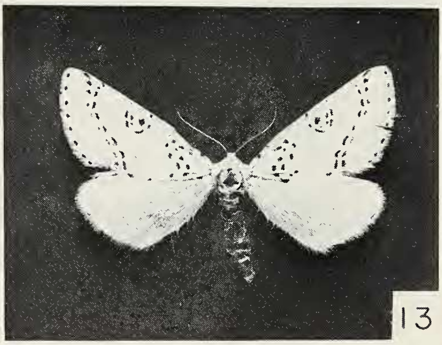

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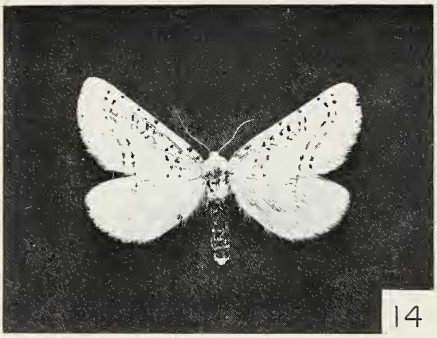

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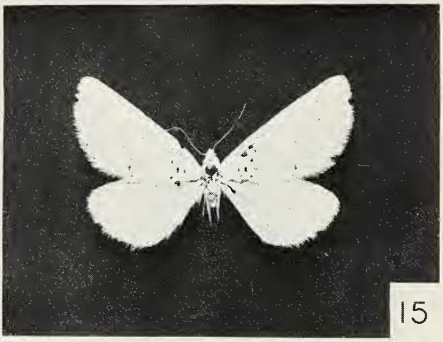

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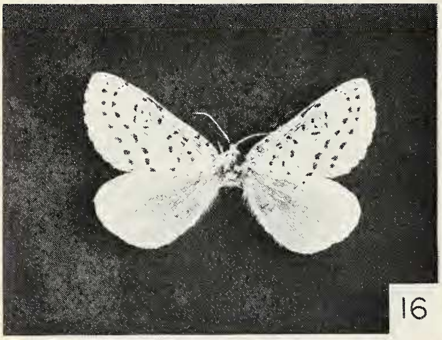
Fig. 10.—R. *latifoliae* Bkt., holotype male. CALIFORNIA: 8+ miles west of Winters, in Solano County, 8 May 1964, ex. *Fraxinus latifolia* (A.N. McFarland, J.S. Buckett and M.R. Gardner), Bauer-Buckett slide no. 67K29-21. Fig. 11.—*P. latifoliae,* allotype female. CALIFORNIA: Vacaville, Solano County, 13 July 1948 (A.T. McClay), Bauer-Buckett slide no. 66B6-21. Fig. 12.—*P. albimaxima* Bkt., holotype male. ARIZONA: Oak Creek Canyon, 15 miles north of Sedona, Coconino County, elevation 5,000 ft., collected at 6:15 AM, 21 July 1965 (F. Thorne). Fig. 13.—*P. albimaxima,* allotype female. ARIZONA: 7 miles west of Williams, Coconino County, 23-28 July 1957 (A.N. McFarland). Fig. 14.—*P. paucimacula* B. & McD., female. TEXAS: Sanderson, Terrell County, 1 April 1953 (Otto Buchholz). Fig. 15.—*P. paucimacula,* female. ARIZONA: Prescott, Yavapai County, 29 April 1961, elevation 5,400' (R.F. Sternitzky), Bauer-Buckett silde no. 66B3-35. Note light color form, obscure maculation.

dash may also be considered part of the broadly geminate transverse anterior line), costa clothed basally in brown scales; transverse anterior line geminate, brown portions of line disjunct, whereas inner medial yellow is nearly continuous, outcurved from costa to inner margin (as in fig. 4.); median area white; apparent reniform or "U" or "O" shaped mark closed costally, multicolored, outer discontinuous band dark brown, thence inwardly a complete yellowish ring, thence with two transversely directed brown bands, medially white; transverse posterior line geminate, colored as in transverse anterior line; terminal area white; terminal line represented by dark brown lunules between veins; fringes white; ventral surface whitish; all maculation of dorsal surface visible through wing when viewed ventrally; secondaries dorsally whitish; may be faint suggestion of lunules between veins forming terminal line; ventral surface as in dorsal surface. Abdomen both dorsally and ventrally clothed predominently in white scales, a few white hairs present also. Greatest expanse of forewing averages very nearly 16mm. Genitalia as in figs. 24 and 33.

Female: As in male, except antennal pectinations shorter; greatest expanse of forewing may average slightly larger than in male. Genitalia as in fig. 41.

Location of type: American Museum of Natural History, New York.

Specimens examined: ARIZONA: 27 males, 10 females, Baboquivari Mountains, Pima County, 23 April 1938 (J.A. Comstock); 49 males, 15 females, same locality as preceding, April (J.L. Sperry); 4 males, 14 females, "Bab. 4-27" (O. Buchholz Collection); 2 males, 2 females, Brown Canyon, Baboquivari Mountains, Pima County, 5 September 1953 (L.M. Martin); 1 female, same locality as preceding, 8 June 1952 (M. Cazier W. Gertsch, R. Schrammel); 3 females, Sabino Canyon, Santa Catalina Mts., Pima County, 9 April 1951 (L.M. Martin); 3 females, El Mirador Ranch, 4 miles northwest Sasabe, Baboquivari Mountains, Pima County, 3,900 feet elevation, 3 September 1950 (T. Cohn, P. Boone, M. Cazier); 2 females, Baboquivari Mountains, Pima County, 4 April 1935 (ex Guedet Coll.); 1 male, Pena Blanca Canyon, Oro Blanco Mountains, Santa Cruz County, 3 August 1960 (L.M. Martin); 1 female, Globe, Gila County, 17 July 1936; 1 female "Ariz.", ex O. Buchholz Coll. "B. & McD. locality Pima Co. Ariz. April 1-15, Coll. Samuel E. Cassino."; 1 female, no locality, "*Philtraea elegantaria* Hy. Edw., Det. Cassino."; 1 male ,"Babquiver Mts." Pima County, "Photograph pl. 20, no. 2", "*P. elegantaria* Hy. Edw. Comp. with Type Coll. Am Mus J. McD.", male genitalia slide 7 October 1939, H.W. Capps #330; 5 males, 2 females, same locality as preceding; 1 male, 9 females, Baboquivari Mountains, Pima County, 1-4 August 1923 (O.C. Poling), "Barnes Collection"; 1 male, 5 females, Sells Post Office, Indian Oasis, Pima County, 1-15 April 1923 (O.C. Poling), "Barnes Collection"; 6 females, Guadalupe Canyon, Cochise County, 31 July 1967 (C.W. Baker).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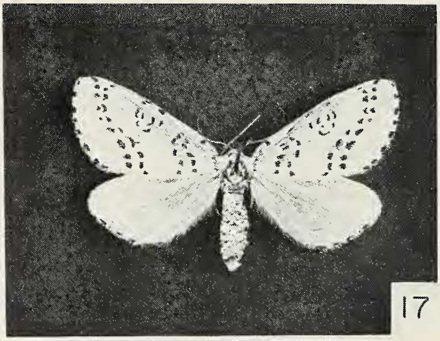
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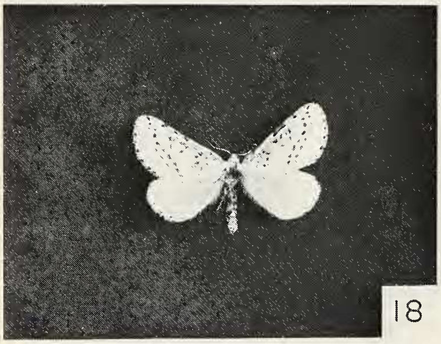
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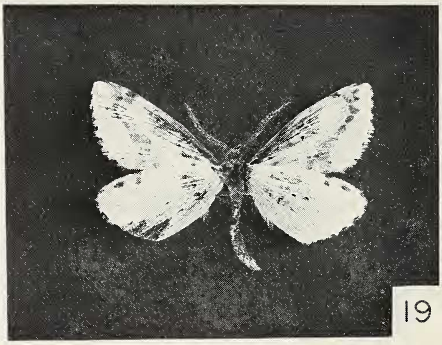
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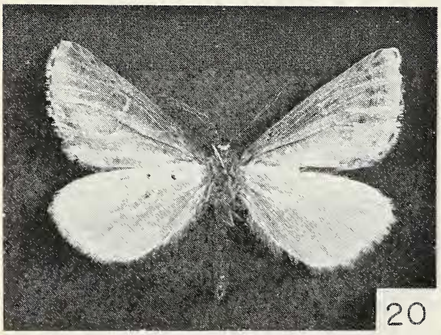
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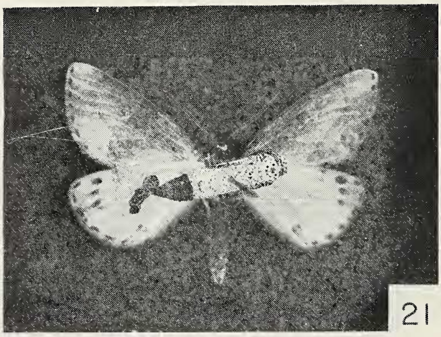
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Fig. 16.—*P. monillata* Bkt., holotype male. MISSOURI. Barnhart, Jefferson County, 25 June 1935 (E.P. Meiners), Bauer-Buckett slide no. 66B2-23. Fig. 17.—*P. monillata*, allotype female. Same data as fig. 16. Fig. 18.—*P. monillata*, paratype male. Same locality as holotype, 26 August 1933 (E.P. Meiners). Note small size of second, or late summer, generation. Fig. 19.—*P. elegantaria*, male. Ventral surface of wings; note absense of fuscous scalation. Data same as fig. 4. Fig. 20.—*P. albimaxima*, holotype male. Ventral surface of wings; note dusky surface of primaries. Data same as fig. 12. Fig. 21.—*P. latifoliae*, holotype male. Ventral surface of wings; note deep fuscous surface of primaries. Also note pupal case with black flecks on whitish background. Data same as fig. 10.

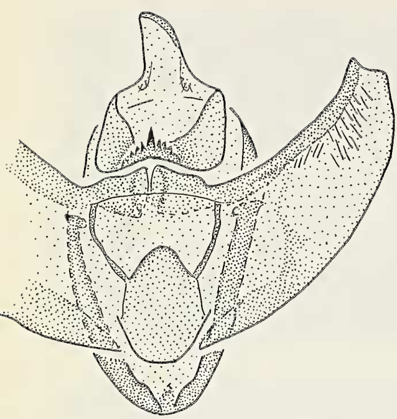
P. elegantaria can be at once separated from *utahensis*, its closest ally, by maculation of the primaries dorsally, and by the shape of the juxta in the male genitalia. The maculation of the primaries in *utahensis* lacks the series of heavy black dots tending the transverse lines, therefore the lines appear more "golden" in color (see figs. 5 and 6); whereas, in *elegantaria* there is a heavy series of black dots tending the transverse lines.

The juxta in the male genitalia of *elegantaria* is narrower and more pointed terminally (as in fig. 24) than in *utahensis*, and this characteristic will serve as of diagnostic value. The present known distribution of *elegantaria* is the southern portion of Arizona, whereas in *utahensis*, the distribution is more northerly (see distribution map, fig. 1). The ventral surface of the primaries in *elegantaria* is white, whereas in *utahensis* it is "off-white".

Philtraea utahensis Buckett, n. sp.

(Figs. 1, 5, 6, 22, 34, 42)

Male: Ground color of primaries white; transverse anterior and transverse posterior lines thin in comparison to *elegantaria*. Head with vertex clothed in predominence of yellow-golden elongate scales and hairs; antennae with scape and pedicel clothed in white scales, flagellum dorsally clothed in white scales, ventrally with elongate bipectinations; frons clothed in both yellow-golden and whitish elongate hairs and scales, integument evenly rounded, but with reticulations; maxillary palpi almost rudimentary, or very reduced, clothed in white hairs; proboscis very diminutive. Thorax dorsally with divided collar clothed in elongate white hairs which are terminally directed centrally; tegulae basally clothed in yellow-golden, terminally composed of elongate whitish hairs; ventrally clothed in elongate whitish hairs and scales; legs with tibiae clothed in whitish and brownish scales and hairs; tarsi clothed in white scales and hairs; primaries dorsally with ground color white; transverse anterior and transverse posterior lines thin, with much yellow, little exterolateral black coloration; "U" or "O" shaped mark between transverse anterior and transverse posterior lines possessing a transversely divided black mark; terminal line faint, represented by black dots between veins; fringes white; ventral surface slightly off-white; maculation of dorsal surface visible through ventral surface; secondaries dorsally white; terminal line faintly discernible at best, blackish; ventral surface whitish, but with terminal line more pronounced, discontinuous over its course. Abdomen as in *elegantaria*. Greatest expanse of forewing 16mm.



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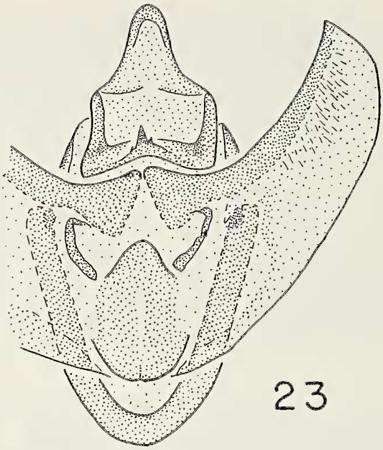

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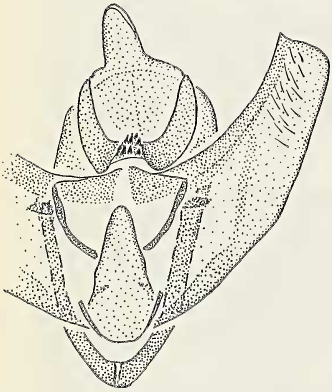

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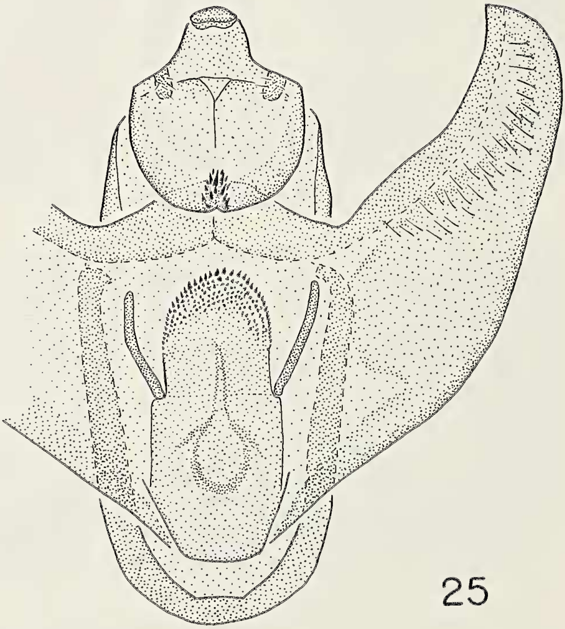

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Fig. 22.—*P. utahensis,* paratype, Bauer-Buckett slide no. 66B2-22. Fig. 23.—*P. surcaliforniae,* paratype, Bauer-Buckett slide no. 67K29-23. Fig. 24.—*P. elegantaria,* homotype, Bauer-Buckett slide no. 66A31-21. Fig. 25.—*P. mexicana,* holotype, Bauer-Buckett slide no. 67D10-1. All male genitalia, minus aedeagus.

Genitalia as in figs. 22 and 34.

Female: As in male but slightly larger; antennal pectinations ± one half the length of male pectinations; primaries dorsally with transverse anterior and transverse posterior lines slightly more black than in male; terminal line more pronounced; ventral surface of primaries white; secondaries dorsally with terminal line more pronounced; ventral surface of secondaries as in dorsal surface. Abdomen as in male. Greatest expanse of forewing 17mm. Genitalia as in fig. 42.

Specimens examined: UTAH: Holotype male: St. George, Washington County, June, genitalia mounted on slide no. 4615 (by F.H. Rindge), in collection American Museum of Natural History, New York. Paratypes: 1 female (designated allotype), same data as holotype. Ac. 4473; 1 male, collection of Grace H. and John L. Sperry, Moab, Grand County, 27 June 1949 (Crickmer); 1 female, collection of Grace H. and John L. Sperry, Monument Valley, San Juan County, 20 June 1949 (Crickmer); NEVADA: 1 female, Beaver Dam State Park, Lincoln County, 27 July 1967 (G.D. Cooney).

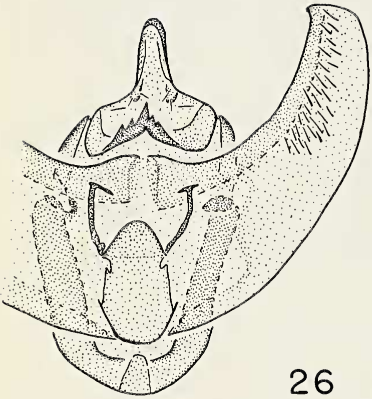
P. utahensis is most closely related to *elegantaria,* as is evidenced by the male genitalia. The juxta in *utahensis* is broader than in *elegantaria*; the maculation of the primaries is different between the species, *elegantaria* possessing much more black in the composition of the transverse anterior and transverse posterior lines; whereas, in *utahensis* this black is somewhat less, therefore giving the impression of the transverse anterior and transverse posterior lines being narrower (see figs. 5 and 6). The ventral surface of the primaries in *utahensis* is "off-white," whereas, in *elegantaria* this surface is white.

Thus far, *utahensis* has only been collected in Utah and Nevada, but with further efforts in the field, it is almost certain that additional distributional data may be obtained. Nothing is known of the immature stages of this species as far as the author can ascertain.

Philtraea surcaliforniae Buckett, n. sp.

(Figs. 2, 9, 23, 36, 43)

Male: Ground color of primaries white, little black associated with transverse lines; "U" shaped mark broadly open costally, Head with vertex clothed in broad, simple, yellow-golden scales; frons clothed in simple white and yellow-golden scales, integument nearly smooth; antennae with scape and pedicel clothed in white scales; flagellum dorsally clothed in white scales, bipectinate beneath, pectinations being ±5X the flagellomere length at central portion of antennae; basal pectinations and terminal pectinations of lesser length; maxillary palpi small, but protruding well beyond region of anterior tentorial pits;



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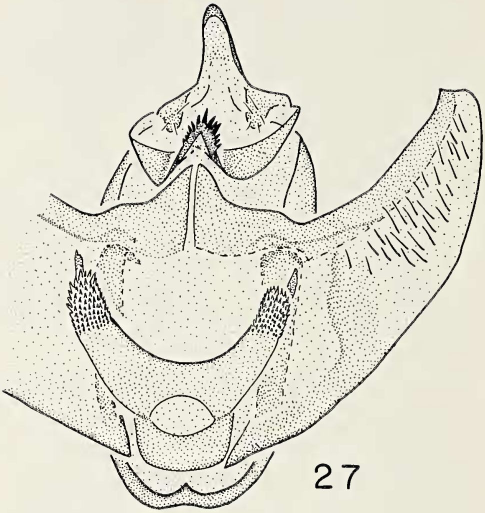

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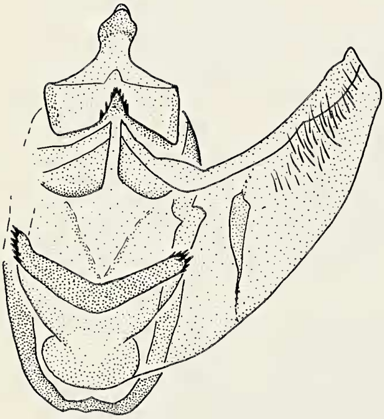

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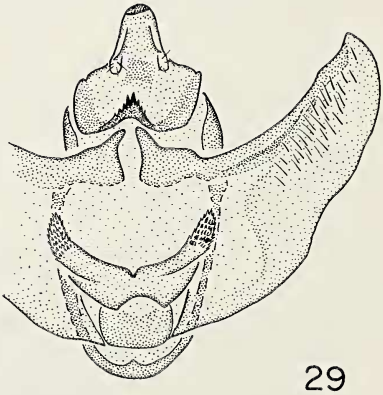

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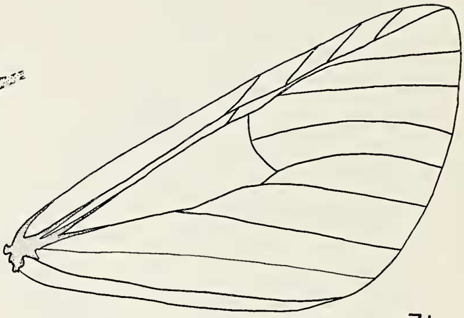
Fig. 26.—*P. latifoliae,* holotype, Bauer-Buckett slide no. 67K29-21. Fig. 27.—*P. albimaxima,* paratype, Bauer-Buckett slide no. 66B3-33. Fig. 28.—*P. paucimacula,* Bauer-Buckett slide no. 67D11-21. Fig. 29.—*P. paucimacula,* Bauer-Buckett slide no. 66B3-24. Note variation between this specimen and fig. 28. Both specimens from New Mexico. All male genitalia, minus aedeagus.

proboscis apparently vestigial. Thorax dorsally with divided collar composed of elongate white hairs and scales, hairs terminally centrally directed toward midline; tegulae prominently yellow-golden laterally, composed of elongate scales, inwardly composed of elongate white hairs; disc clothed in minute white scales and sparsity of elongate white hairs; ventrally clothed in white scales and elongate white hairs; legs clothed in white scales; tibial end spurs clothed in brown hairs; primaries dorsally with ground color white; transverse anterior and transverse posterior lines broadly spaced on inner margin, coloration predominently yellow, very little black; "U" shaped mark broadly open on costa; terminal line represented by dashes between veins; fringes white; ventral surface white, maculation of dorsal surface being plainly seen when observing ventral surface; secondaries dorsally white, slight suggestion of terminal line, fringes white; ventral surface white; terminal line prominent; black dot present at wing apex. Abdomen clothed dorsally and ventrally in white scales and sparsity of white hairs. Greatest expanse of forewing 20mm. Genitalia as in figs. 23 and 36.

Female: As in male except for antennal bipectinations which are ±2X flagellomere length at central portion of antennae. Greatest expanse of forewing ±20mm. Genitalia as in fig. 43.
expanse of forewing ±20mm. Genitalia as in fig. 43.

Specimens examined: CALIFORNIA: Holotype male: Howard Creek, Ventura County, 15 July 1967 (P.M. Jump), in Type Collection, Department of Entomology, University of California, Davis, California. Paratypes: 1 female (designated allotype), San Marcos Pass, north of Santa Barbara, Santa Barbara County, 4 July 1965 (J.S. Buckett); 1 femle, same data as in preceding; 2 females, same locality as preceding, 4 and 7 July 1965 (J.A. Powell); 2 females, Ojai, Ventura County, 15 July 1940; 1 female, same locality as preceding, 15 July 1963 (W.E. Simonds); 1 female, Bouquet Canyon, Los Angeles County, 2,800 feet elevation, 14 June 1946 (C. Henne); 1 female, Santa Barbara, Santa Barbara County, 25 August 1966 (R. Young); 2 females, Summerland, Santa Barbara County, 19 June and 1 July 1949, (C.W. Kirkwood); 1 female, Santa Barbara, Santa Barbara County, 27 June 1938 (C.W. Kirkwood); 1 female, Jucumba, San Diego County, 24 May 1921; 1 female, Wheeler's, Ventura County, 13 July (P.M. Jump); Mint Canyon, Los Angeles County, 10 June 1950 (C. Hill), in collection of Grace H. and John L. Sperry; 1 female, Murrieta, Riverside County, 1 June 1939 (J. von Bloeker), (Bauer-Buckett slide no. 66B4-22); 2 females, Ventura, Ventura County, 22 June 1949 (C.W. Kirkwood); 3 females, San Louis Obispo County, with label affixed "Through C.V. Riley"; 1 male, 13 females, Howard Creek, Ventura County, 17 June 1965 (P.M. Jump); 11 males, 30 females, same locality and collector as in preceding, 15 July 1967; 1 female, Ojai, Ventura County, 21 June 1960 (P.M. Jump). Additional specimens: MEXICO: 1 male, Guaycura Hotel grounds, La Paz, Baja California, Sur, 2 December 1961, Cary-Carnegie Expedition, C.M. Acc. 20082, (genitalia on slide, F.H. Rindge no. 12,595).



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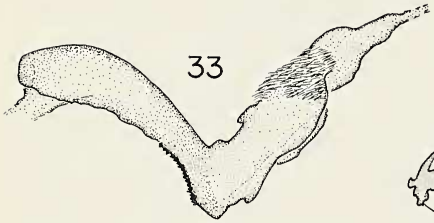

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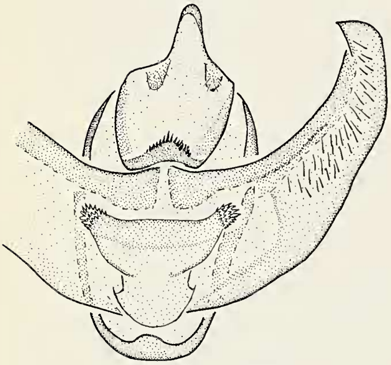

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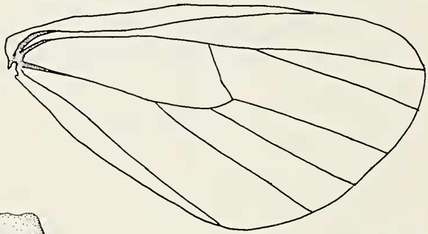

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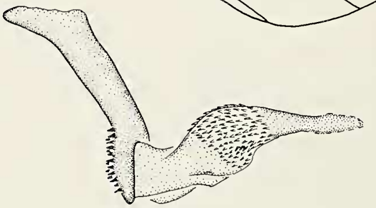

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Fig. 30.—*P. monillata*, paratype, Bauer-Buckett slide no. 66B-2-23. Male genitalia, minus aedeagus.

Fig. 31.—*P. elegantaria*, venation of right forewing. Slide from American Museum of Natural History bearing no. 5103.

Fig. 32.—*P. elegantaria*, venation of right hindwing. Data same as fig. 31.

Fig. 33—*P. elegantaria*, Bauer-Buckett slide no. 67D10-23. Aedeagus of male genitalia inflated.

Fig. 34—*P. utahensis*, paratype, Bauer-Buckett slide no. 66B2-22. Aedeagus of male genitalia inflated.

P. surcaliforniae is a large species, thus far known only from southern California, and from 1 male specimen taken in Baja California, Sur, Mexico. It may be distinguished from *mexicana* by the lack of prominent black marks tending the transverse lines on the primaries. From *latifoliae, surcaliforniae* may be distinguished by the absence of the deep fuscous coloration on the ventral surface of the primaries in the male. At this time, it is difficult to compare females of *surcaliforniae* and *latifoliae,* because the two female specimens of the latter species are in poor condition. By male genitalia, *surcaliforniae* differs from *latifoliae* by the former possessing more sclerotized genitalia in general; broader uncus; more rectangular, apically pointed juxta (rather than subconical); larger aedeagus; more heavily spinose vesical sac.

Thus far, in the larval stage, *surcaliforniae* is known to feed on *Fraxinus dipetala* H. & A. (flowering ash). Comstock (1934), under the species heading "*elegantaria*" records the following for *surcaliforniae*: "On June 17, 1933 while beating *Ceanothus* bushes in Bouquet Canyon for larva, a single chrysalis was secured, which, on June 23, gave forth an imago. This proved to be a female, and fortunately produced a few eggs while on the setting block. These were, of course, infertile, and it was therefore impossible to record the larva." He further states of the immature stages: "Egg. Size .75mm. tall x .5mm. thick. Color, opaque light green. In form it is sub-ovoid, with a rounded base and strongly cupped top. The surface is smooth, except for the micropylar end, which is finely granular. . . . Pupa. Length, 13mm. Greatest width through 3rd abdominal segment, 3.2mm. Color, lemon-yellow, with numerous black markings, disposed as shown in illustration. Antennal cases black."

It is interesting to note that the "lemon-yellow" ground color of the pupa is slightly different than the color for the pupa of *latifoliae*. The coloration of the pupa may serve as a distinguishing factor between the two California species. In addition, the presently known distribution limits *surcaliforniae* to southern California (see distribution map, fig. 2), on into Baja California, Sur, Mexico.

Philtraea latifoliae Buckett, n. sp.

(Figs. 2, 10, 11, 21, 26, 35, 44, 49-52)

Male: Ground color of primaries dorsally white, ventrally deep fuscous, transverse lines thin, with much yellow and black, maculation prominent. Head with vertex clothed in deep brilliant gold scales and hairs; frons clothed dorsad in whitish

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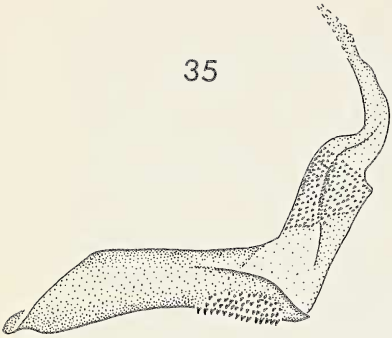

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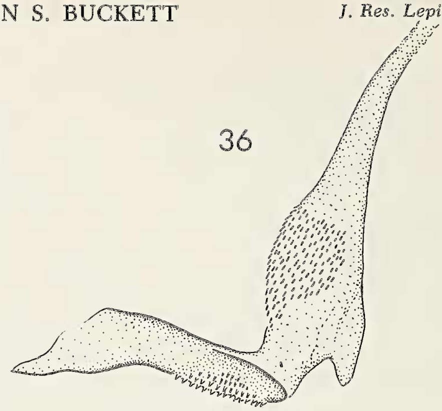

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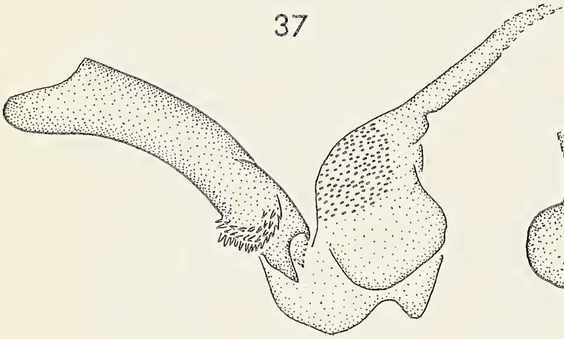

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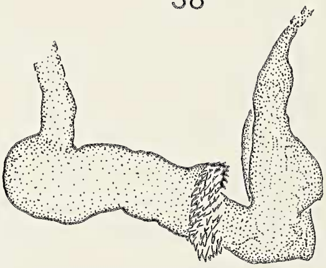

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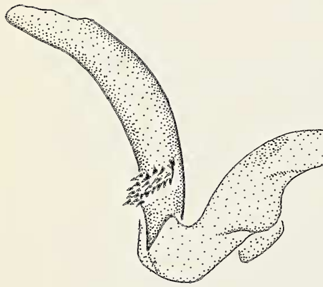

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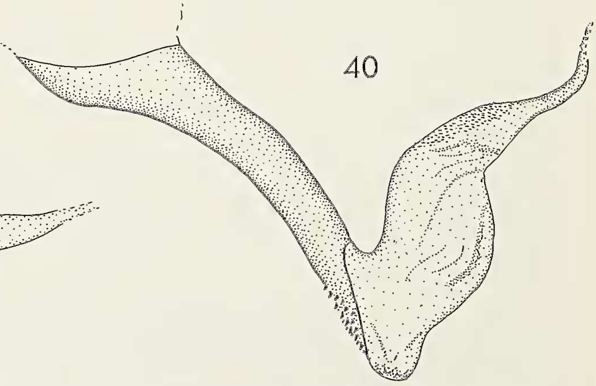


Fig. 35.—*P. latifoliae,* holotype, data same as fig. 26. Fig. 36.—*P. surcaliforniae,* paratype, data same as fig. 23. Fig. 37.—*P. albimaxima,* paratype, data same as fig. 27. Fig. 38.—*P. paucimácula,* Bauer-Buckett slide no. 67D10-22. Fig. 39.—*P. monillata,* paratype, data same as fig. 30. Fig. 40.—*P. mexicana,* holotype, data same as fig. 25. All aedeagi of male genitalia inflated.

scales and hairs, remainder clothed as in vertex; maxillary palpi short, clothed exterolaterally in fuscous; proboscis very diminutive, appearing as though wanting; antennae with scape and pedicel clothed in snow-white broad scales; flagellomeres dorsally clothed in snow-white scales to terminal end, ventrally with bipectinations very long. Thorax with collar white, composed of elongate scales and hairs; tegulae clothed in very elongate thin hairs, basally brilliant golden, terminal two-thirds white; disc clothed in white hairs and few white scales; ventrally clothed in elongate fuscous hairs; legs dark exterolaterally, clothed predominently in elongate hairs, also few dark scales; primaries dorsally with ground color pure white; costa clothed in golden scales basally to transverse anterior line, the only interruption being a black dot where basal line would commence; transverse anterior line represented costally in black, thence golden, bordered by black dots between veins, from costa outcurving medially, thence toward base, thence outward to inner margin; "U" shaped mark of median area open costally, colored as in transverse anterior line; transverse posterior line colored as in transverse anterior line, thinnest medially; terminal line represented as black lunules between veins; fringes off-white; ventral surface deep smokey fuscous, but maculation of dorsal surface visible through wing; secondaries dorsally white with exterior line represented by black dots (as in fig. 10); terminal line represented by black lunules between veins; fringes off-white; ventral surface marked as in dorsal surface, but with darker ground color. Abdomen clothed in elongate white hairs and scales both dorsally and ventrally. Greatest expanse of forewing 17mm. Genitalia as in figs. 26 and 35.

Female: Lighter than in male, maculation less prominent; secondaries lacking exterior line as in male; ventral surface much lighter in color than in male, but with taint of fuscous. Greatest expanse of forewing 18mm. Genitalia as in fig. 44.

Specimens examined: CALIFORNIA: Holotype male: 8+ miles west of Winters, in Solano County, 8 May 1964, ex *Fraxinus latifolia* (Oregon ash), McFarland larval no. G.56 (A.N. McFarland, J.S. Buckett & M.R. Gardner), Bauer-Buckett slide no. 67K29-21, (in type collection, Entomology Department, University of California, Davis. Paratypes: 1 female (designated allotype), Vacaville, Solano County, 13 July 1948 (A.T. McClay), Bauer-Buckett slide no. 66B6-21; 1 female, 3.5 miles northwest of Rumsey, Yolo County, 30 June 1967, 10:30 PM, light trap (R.F. Denno).

Mature larva: Head ±1.8mm broad; maculation and chaetotaxy of head, thorax and abdomen as illustrated (see figs. 49, 50, 51 and 52), ground color creamy-white. Total length of inflated

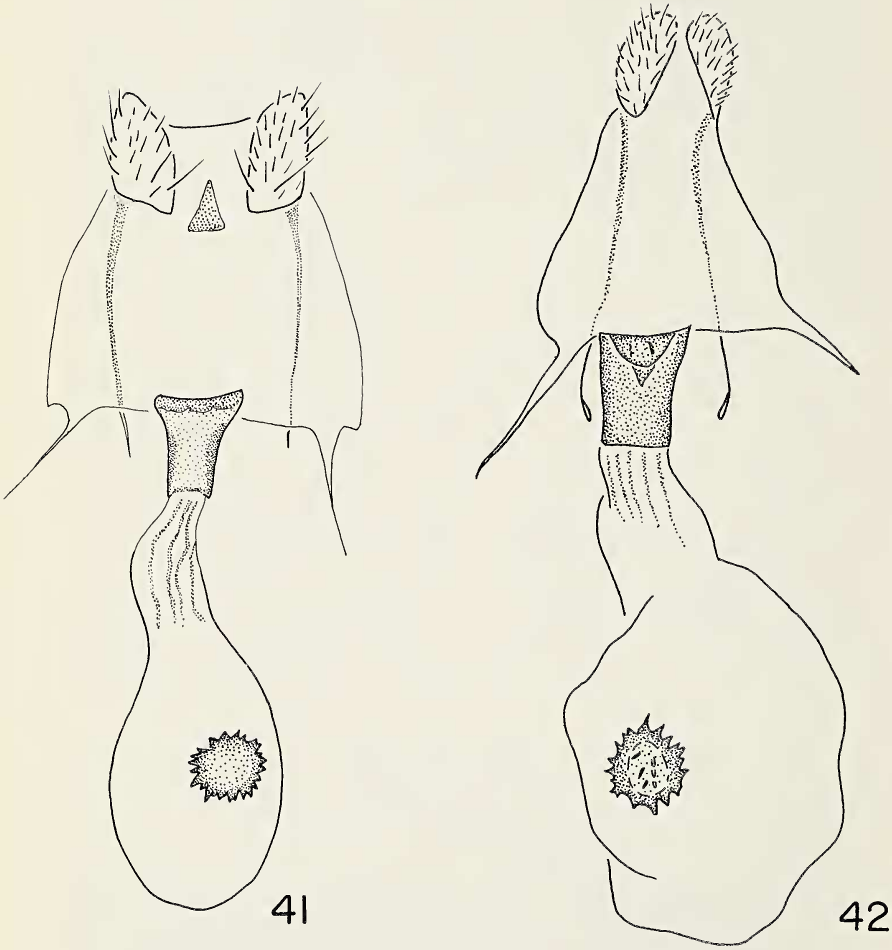


Fig. 41.—*P. elegantaria,* Bauer-Buckett slide no. 66B3-35. Fig. 42.—*P. utahensis,* paratype, Bauer-Buckett slide no. 68J30-2. Female genitalia.

larva [preserved in KASA = 3 parts, Kerosene; 9 parts, 95% ethyl alcohol; 5 parts, sec-butyl alcohol; 2 parts, glacial acetic acid, and later transferred to 100% ethanol] ±28mm.

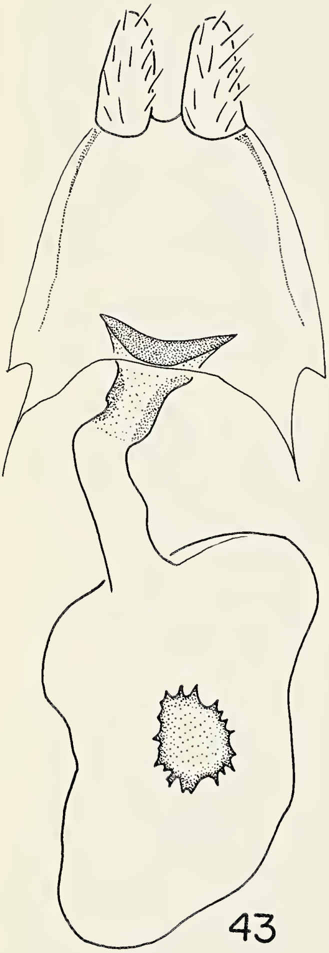
Ground color dorsally light grey, integument slightly glossy, ventrally paler, a whitish-grey. Subdorsal yellow spots present, one pair per segment, as well as a similar series of subspiracular yellow-orange dots; also similar, but fainter dots on venter of abdominal segments 1 through 5 and on venter of abdominal segment 7. Body strongly marked with small, black setigerous tubercles; also possessing very fine, narrow, transverse lines on dorsal and lateral areas; prolegs of sixth abdominal segment with triordinal crochets, a homoideous mesoseries; anal prolegs with triordinal crochets, an interrupted mesoseries.

General outline peculiar in that it becomes posteriorly enlarged, thickest in abdominal segments 4, 5 and 6 than elsewhere.

If handled, larva will fold up and fall over on its side, remaining quiescent for many minutes; larva assumes a "fish-hook" position when feigning death. When the host plant is beaten or shaken, the larvae will drop on tough silken strands, rendering them quite easily attainable to the collector.

Host plant: Fraxinus latifolia Benth. (Oregon ash), as far as is known. Many larvae collected 8 May 1964 at the type locality (A.N. McFarland, J.S. Buckett and M.R. Gardner).

Pupa: (see fig. 21). Extremely colorful. Head very bright yellow; a black crescent present over part of each compound eye; antennal cases brown, speckled with black laterally. Thorax yellowish-grey, dotted with black; wing cases bright deep yellow, speckled with black in a small area near middle of costal margin, also marked with black along the outer margin and at inner angle; area of legs pale yellow-grey with scattered black dots present also. Abdomen with ground color light grey; two subdorsal rows composed of deep yellow spots present (in some pupae, the yellow coloration of the abdomen is not well defined into spots, but is more generally distributed on the dorsum); black tubercles present all over abdomen also; cremaster black. Pupa capable of lively, circular abdominal movement. It is found in a weak "cocoon" or open "net", suspended in the air between two or more leaves, or in somewhat a protected place. Pupa easily seen through the *very* open net of colorless silk.



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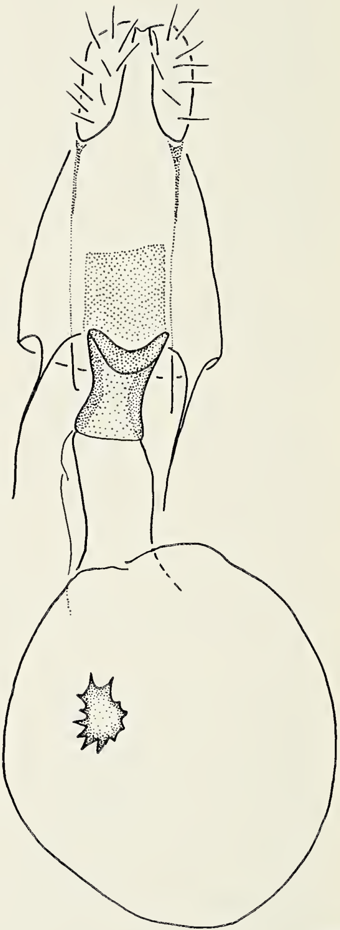

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Fig. 43.—*P. surcaliforniae,* paratype, Bauer-Buckett slide no. 66B4-21. Fig. 44.—*P. latifoliae,* paratype, Bauer-Buckett slide no. 68I19-1. Female genitalia.

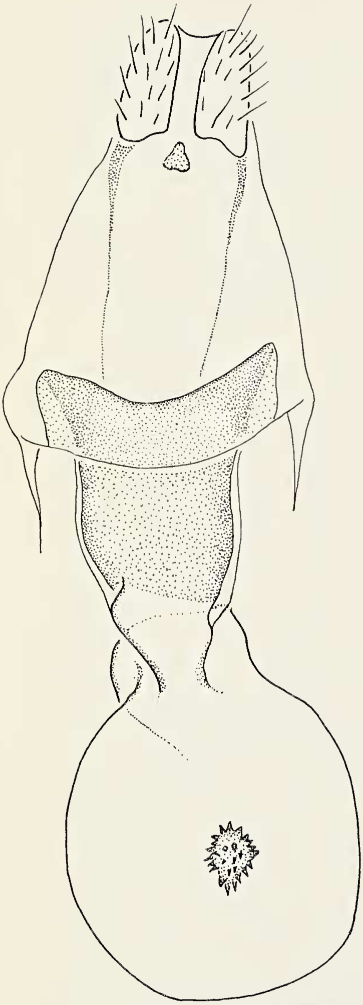
The above larval and pupal descriptions were drawn from and slightly modified from notes taken of living specimens by my good friend and colleague Mr. A. Noel McFarland. For use of these notes (McFarland No. G.56) I am greatly indebted.

P. latifoliae is most closely related to *P. albimaxima* in the male by the fuscous ventral surface of the primaries. By male genitalia, *latifoliae* is most closely related to *surcaliforniae*; however, in the former species, the genitalia is less sclerotized; juxta subconical (rather than nearly rectangular as in *surcaliforniae*); smaller aedeagus; lightly spinose vesical sac. In addition, the known range of *latifoliae* is Yolo and Solano Counties, far to the north of the range of other species within the genus (see distribution map, fig. 2). Along with *elegantaria, utahensis,* and *surcaliforniae, latifoliae* is placed in the *elegantaria* species group.

Philtraea mexicana Buckett, n. sp.

(Figs. 3, 7, 8, 25, 40, 45)

Male: Lacks antennae and is somewhat worn, but was the only male of the species present at the time of description. Ground color of primaries whitish, transverse lines broad, possessing much black. Head with vertex and frons clothed in white scales; integument of frons slightly roughened; palpi and proboscis as for other members of the genus, but the latter somewhat better developed than in *elegantaria.* Thorax with collar somewhat damaged, but remaining vestiture composed of white scales and white elongate hairs; tegulae with suggestion of pale yellow hairs in addition to white scales and white elongate hairs; ventrally clothed in whitish hairs and scales; legs normal (metathoracic legs absent, due to breakage); primaries dorsally whitish; transverse anterior and transverse posterior lines broad, centrally filled with much yellow, exterolaterally with much black (see fig. 7); "U" shaped mark open on costa between transverse anterior and transverse posterior lines, almost connecting with transverse posterior line; terminal line represented by black lunules between veins; fringes white; ventral surface just off white in coloration; dorsal maculation clearly visible through ventral surface; secondaries dorsally whitish; slight suggestion of fringe, in black; ventral surface as in dorsal surface but veins faintly outlined in fuscous terminally. Abdomen clothed predominently in white scales and elongate hairs. Greatest expanse of forewing 21mm. Genitalia as in figs. 25 and 40.



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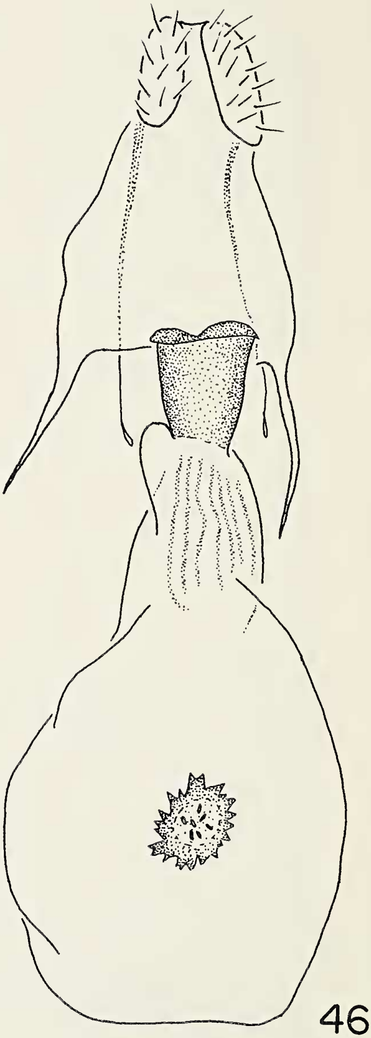

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Fig. 45.—*P. mexicana*, paratype, Bauer-Buckett slide no. 67D11-24. Fig. 46.—*P. albimaxima*, allotype, Bauer-Buckett slide no. 68J30-1. Female genitalia.

Female: As in male but smaller, pectinations of antennae small; dorsal surface of antennae clothed in white scales; tegulae whitish; primaries lacking prominent yellow centrally in transverse anterior and transverse posterior lines, as well as in "U" shaped mark; otherwise as in male. Greatest expanse of forewing 18mm (see fig. 8). Genitalia as in fig. 45.

Specimens examined: MEXICO: Holotype male: "Mexico", with no further locality data, (R. Muller), Bauer-Buckett slide no. 67D10-21 (in collection of United States National Museum). Paratypes: 1 female (designated allotype), 3 miles east of Galeana, Nuevo Leon, 5,000 feet elevation, 7-9 August 1963 (W.D. Duckworth and D.R. Davis); 4 females, same data as in preceding; 1 female, Bahia de Palmas, Baja California, Sur, 2 November 1961, Cary-Carnegie Expedition 1961, C.M. Acc. 20082; 1 female, Rancho San Bernardino, Sierra Laguna, Baja California, 2 November 1961, same expedition and number as preceding, Bauer-Buckett slide no. 66B4-23; 1 female, A. San Bartolo, Baja California, Sur, 2 November 1961, same expedition and number as preceding; 3 females, Ridge northwest of Jocoque Dam, Aguascalientes, 19 August 1960 (P.H. Arnaud, Jr., E.S. Ross, and D.C. Rentz); 1 female, Actopan, Coll. C.C. Hoffmann, Cat. No. 2855 (genitalia on slide F.H. Rindge, No. 4628); 1 male, Creel, Chihuahua, 14 July 1968, 7,500 feet elevation (T.A. Sears and R.C. Gardner).

P. mexicana is a large species which possesses a considerable amount of black tending the transverse cross lines on the dorsal surface of the primaries. This characteristic is unlike *surcaliforniae* and *albimaxima* with which it might be confused due to the large size of specimens of the three species concerned. Also in the male genitalia, heavy sclerotization and the shape of the juxta (see fig. 25) will serve to distinguish *mexicana* from related entities. By the female genitalia, the heavily sclerotized trapazoidal ductus antivaginalis will serve as a diagnostic character.

I herein consider *mexicana* as representing a monotypic species group and it appears to apparently be intermediate between the *paucimacula* group and the *elegantaria* group. The presently known distribution of *mexicana* encompasses central Mexico and Baja California, Sur, Mexico (see distribution map, fig. 3).

Philtraea albimaxima Buckett, n. sp.

(Figs. 1, 12, 13, 20, 27, 37, 46)

Male: Ground color of primaries a glistening white, maculation not too prominent. Head with vertex and frons clothed in pale yellow scales and hairs; integument of frons evenly rounded, rather flat, reticulate over its surface; antennae with scape and pedicel clothed in white scales; flagellum dorsally clothed in

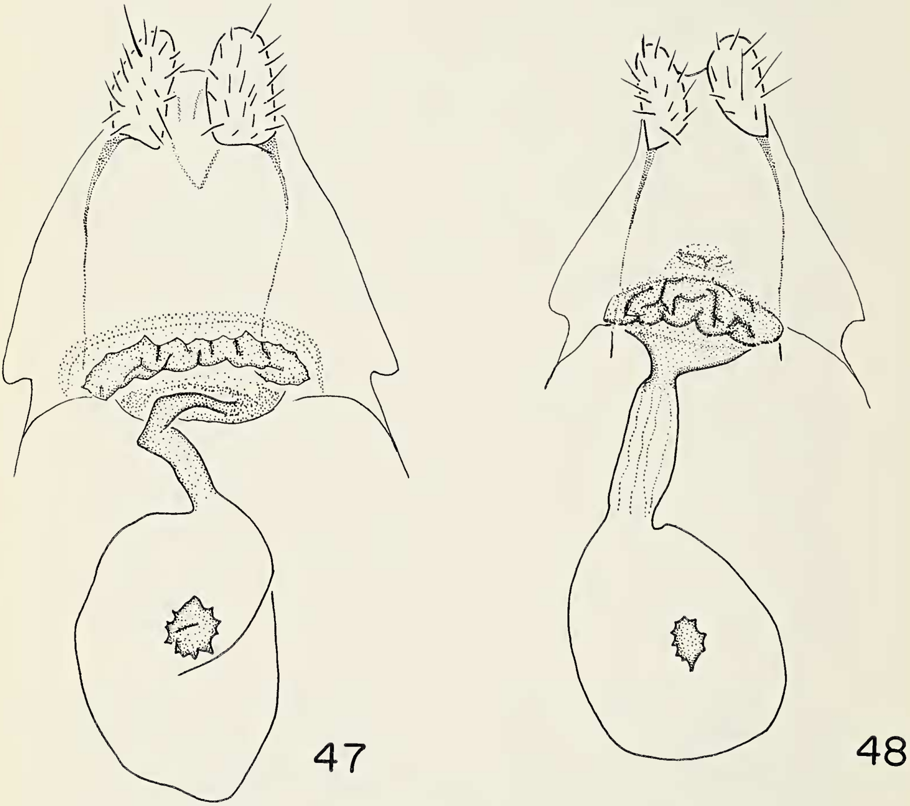


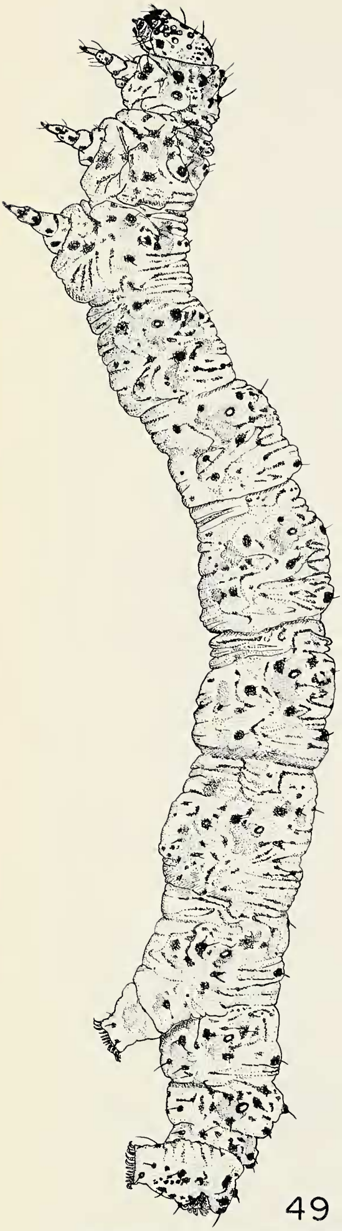
Fig. 47.—*P. paucimacula,* Bauer-Buckett slide no. 66B3-32. Fig. 48—*P. monillata,* paratype, Bauer-Buckett slide no 66B3-23. Female genitalia.

white scales; ventrally, bipectinations extremely long; maxillary palpi protruding beyond region of anterior tentorial pits, clothed in white elongate hairs, terminal segment black-tipped; proboscis small. Thorax dorsally with divided collar basally yellow, thence composed of elongate white hairs; tegulae basally clothed in yellow-golden scales and hairs, medially and terminally composed of elongate white hairs; disc clothed in small white scales and sparsity of white hairs; legs with femora and tibiae dorsally clothed in brown scales, ventrally clothed in white scales; protarsi dorsally clothed in white scales, ventrally in brown; meso and metatarsi clothed dorsally in brown, ventrally in white; primaries dorsally a glistening white, transverse anterior line geminate, outer thin bands represented by black dots between veins, central portion faint, light yellow; "U" shaped mark open on costa, colored as in transverse anterior line; transverse posterior line represented from costa to Cu_2 merely as a geminate line of black dots, central color white, from Cu_2 to inner margin, transverse posterior line colored as in transverse anterior line; terminal line represented as black dashes between veins; fringes white; ventral surface conspicuously dusky, veins darker; dorsal maculation seen through ventral surface; fringes white; secondaries dorsally white; slight suggestion of terminal line; fringes white; ventral surface as in dorsal surface. Abdomen dorsally and ventrally clothed in white scales and sparsity of white hairs. Greatest expanse of forewing 20mm. Genitalia as in figs. 27 and 37.

Female: Similar to male except for antennal ciliations which are shorter; transverse lines somewhat more prominent; ventral surface of primaries white. Greatest expanse of forewing 20-21mm. Genitalia as in fig. 46.

Specimens examined: ARIZONA: Holotype male: Oak Creek Canyon, 15 miles north of Sedona, Coconino County, 5,000 feet elevation, collected at 6:15 AM, 21 July 1965 (F. Thorne), (in collection of the Los Angeles County Museum of Natural History, Los Angeles, California). Paratypes: 1 female (designated allotype), 7 miles west of Williams, Coconino County, 23-28 July 1957 (A.N. McFarland); 1 male, same locality and collector as holotype, Bauer-Buckett slide no. 66B3-33; 6 males same locality and collector as preceding; 4 males, collection of Grace H. and John L. Sperry, Todd's Lodge, Oak Creek Canyon, Coconino County, 16-18 June 1946, (1 male bearing Bauer-Buckett slide no. 66B3-34).

P. albimaxima is, perhaps, one of the least striking of the *Philtraea* in that it lacks prominent transverse crosslines on the dorsal surface of the primaries. In addition, in the male, the ventral surface of the primaries is fuscous rather than white, or "off-white", as is found in other species of the *paucimacula* group. *P. albimaxima* is one of the most distinct species in the genus, and when considering a combination of characters, can-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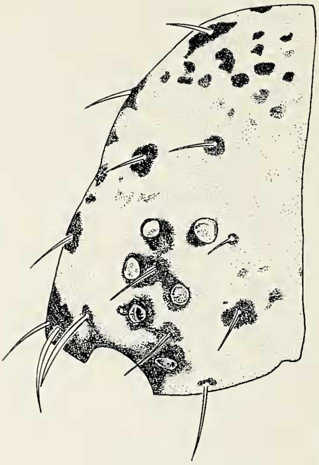
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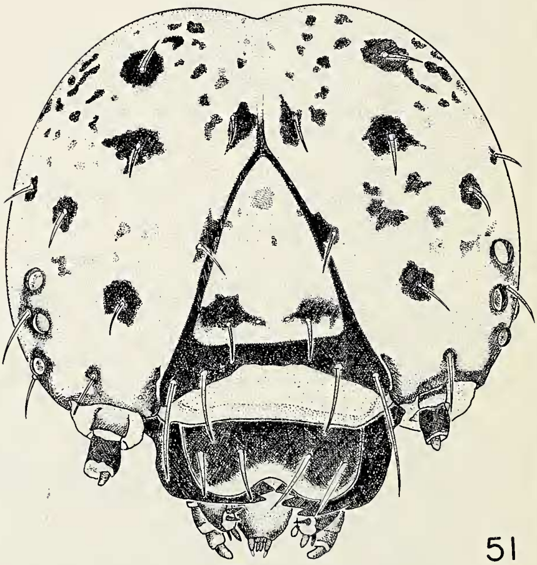
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Fig. 49.—*P. latifoliae*, ultimate instar larva, laterial view. Fig. 50.—*P. latifoliae*, head, laterial view. Fig. 51.—*P. latifoliae*, head, frontal view. All CALIFORNIA: 8+ miles west of Winters, in Solano County, 8 May 1964 (A.N. McFarland, J.S. Buckett and M.R. Gardner).

not be confused with any other species within the genus.

As mentioned for *latifoliae, albimaxima* is the only other species in which the male possesses the fuscous ventral surface of the primaries. The male genitalia are typical for the *paucimacula* group as herein conceived (see figs. 27 and 37).

Thus far, *albimaxima* is only found in and adjacent to the Oak Creek Canyon, Arizona. Nothing is yet known concerning the immature stages of this species.

Philtraea paucimacula Barnes and McDunnough
(Figs. 3, 14, 15, 28, 29, 38, 47)

Male: Ground color of primaries white both dorsally and ventrally, transverse lines thin, with much yellow, or maculation may be lacking. Head with vertex clothed in yellowish to yellowish-golden scales and hairs; frons clothed in white, yellow scales and hairs; integument roughened, granulated; maxillary palpi small, not extending beyond area of anterior tentorial pits, clothed in white scales and elongate hairs ventrally; proboscis diminutive; antennae with scape and pedicel clothed in white scales; flagellomeres dorsally clothed in white scales, ventrally bipectinate. Thorax with divided collar composed of white elongate hairs and scales; tegulae clothed basally in yellow scales and hairs; terminally clothed in elongate white hairs; disc clothed in small white scales; ventrally clothed in elongate white hairs and scales; legs clothed predominently in white hairs, but white scales also present; primaries with ground color of dorsal surface white; transverse lines from wanting to strongly represented in yellow, very little black bordering lines; transverse anterior line thin, yellow, exterolaterally bordered with diminutive black dots between veins; "O" or "U" shaped mark colored as in transverse anterior line, when discernible, equally removed from both transverse anterior and transverse posterior lines; transverse posterior line as in transverse anterior line, but outermost or terminal row of black dots less obvious than innermost row; terminal line represented by black dots between veins; fringes white; ventral surface white, maculation of dorsal surface visible through ventral surface when present; secondaries dorsally white, no maculation present; ventral surface as in dorsal surface. Abdomen clothed in white scales and sparsity of elongate white hairs. Greatest expanse of forewing from 12-16mm. Genitalia as in figs. 28, 29 and 38.

Female: As in male, but may be of duller coloration. Antennal bipectinations shorter than in male. Greatest expanse of forewing from 13-18mm. Genitalia as in fig. 47.

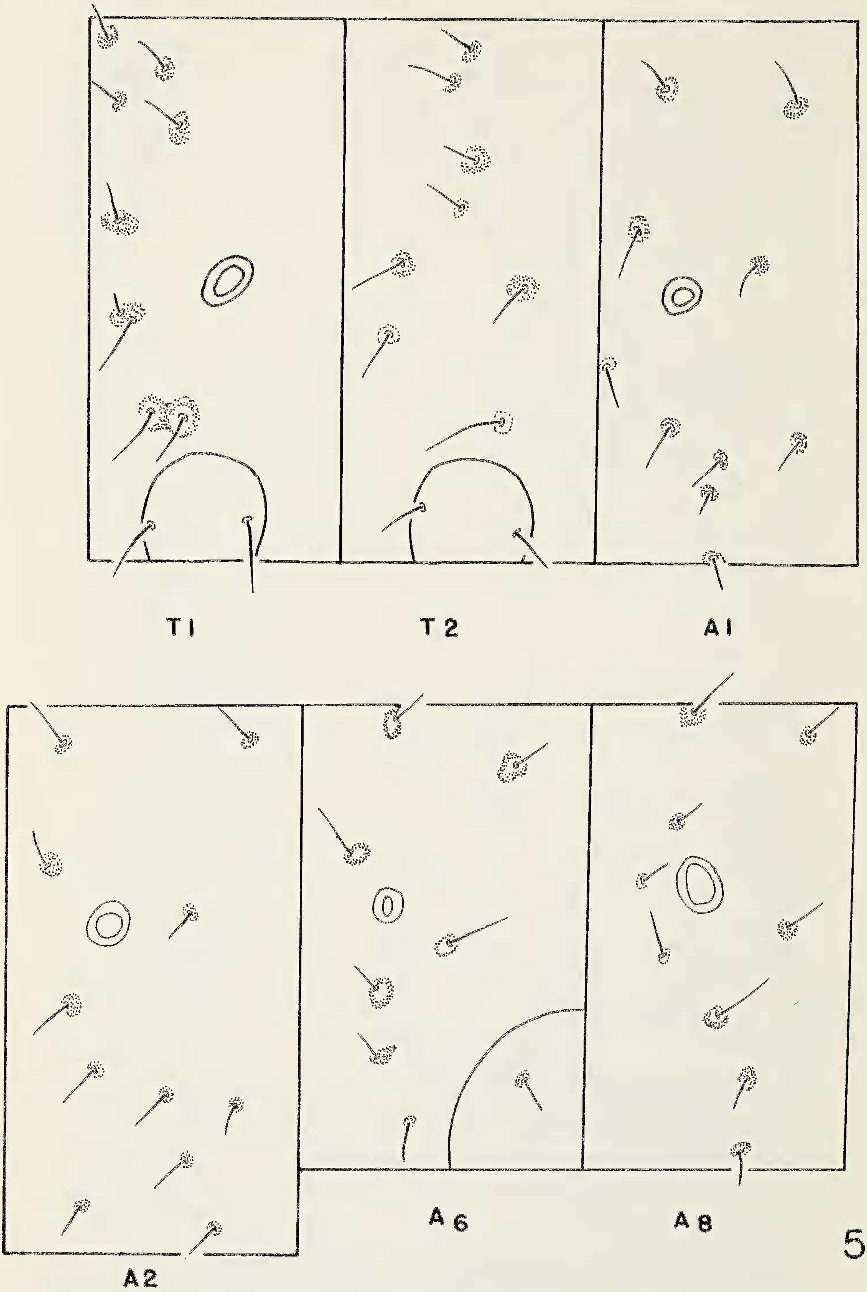

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Fig. 52.—*P. latifoliae*, chaetotaxy of ultimate instar larva. T_1 and T_2 = Thoracic segments 1 and 2 respectively; A_1, A_2, A_6, and A_8 = Abdominal segments 1, 2, 6, and 8, respectively. Collection data same as fig. 49.

Specimens examined: TEXAS: Paratypes: 1 female, San Benito, Cameron County, 16-23 March, "Photograph pl. 20 No. 3"; 1 male, same locality and collection data as preceding, genitalia mounted on Bauer-Buckett slide no. 67D10-22 (in collection United States Nat. Mus.); 5 females, same locality and collection date as preceding. Additional Specimens: 3 males, 8 females, Alpine, Brewster County, April, (O. Buchholz Collection); 1 male, same locality and collection as preceding, May; 1 female, Big Bend National Park, Brewster County, 27 May 1952, 4,000 feet elevation (M. Cazier, W. Gertsch and R. Schrammel); 1 female, Big Bend National Park, Basin, 30 August 1964 (A. & M.E. Blanchard); 1 male, 2 females, same locality as preceding, 5 October 1956, (J.W. MacSwain); 2 males, Davis Mountains, Jeff Davis County, July, 1928 (O. Buchholz Collection); 1 male, same locality and date as preceding, det. Barnes and McDunnough, (Guedet Collection); 4 males, 2 females, Corpus Christi, Nueces County, 11 April 1907, "on weeds", (C.S. Spooner); 1 female, Sanderson, Terrell County, 1 April 1953 (O. Buchholz). NEW MEXICO: 3 females, Fort Wingate, McKinley County, 8-15 July (Barnes Collection); 2 males, 8 females, same locality as preceding, 1 July (J.A. Grossbeck Collection); 3 males same locality and collection as preceding, 29 June; 1 male, 1 female, same locality and collection as preceding, 10-11 July; 1 male, Jemez Springs, Sandoval County, 17 June 1916, (Barnes Collection), Bauer-Buckett slide no. 67D11-21 (in collection United States Nat. Mus.); 19 males, 9 females, Frijoles Canyon, 20 June 1942, (Collection of Grace H. and John L. Sperry). ARIZONA: 2 males, 1 female, Gila County, June, 1902 (O.C. Poling); 1 female, Hualapai Mountains, Mohave County, 15 July 1936, (Bauer-Buckett Collection); 6 females, Jerome, Yavapai County, 24 June 1901, Ac. 4473, (J.A. Grossbeck Collection); 1 male, 1 female, Prescott, Yavapai County, 1-7 July (Barnes Collection); 2 males, 2 females, same locality as preceding, 5,400 feet elevation, 15-19 June 1951 (R.F. Sternitzky); 1 male, Oak Creek Canyon, 24 June 1942, (O. Buchholz Collection); 2 females, White Mountains, (Barnes Collection); 2 males, southern Arizona, (O.C. Poling), (Barnes Collection). MEXICO: 1 female, 20 miles south Sabinas Hidalgo, Nuevo Leon, 7 July 1966 (J.S. Buckett, M.R. and R.C. Gardner); 1 female, San Juan del Rio, Durango, 5,200 feet elevation, 1 August 1957 (W. Gertsch and M. Cazier); 1 male, Salaices, Chihuahua, 23 July 1947 (W. Gertsch and M. Cazier); 1 female, 63 miles west of Santa Barbara, Chihuahua, 5,500 feet elevation, 20 July 1947, (W. Gertsch and M. Cazier).

Larval stage: Unknown.

Larval hostplants: Affixed to each of three specimens is a label which reads "on weeds."

P. paucimacula appears to be most closely related to *monillata*, from which it can be readily separated by the much narrower transverse lines of the dorsal surface of the primaries (see figs. 14 and 15), and more widespread westerly distribution. In addition, the univoltine habit of *paucimacula*, too, shows it to be different ecologically from the bivoltine *monillata* (however, a few specimens of *paucimacula* were collected in late summer).

By male genitalia, it is more difficult to distinguish between *paucimacula* and *monillata*. In the male of *paucimacula*, the lateral projections of the juxta are more pointed, and more heavily spinose; the costal undulation between the laterial projections of the juxta is not slightly raised medially. In general, the male genitalia of *paucimacula* is more heavily sclerotized, and the aedeagus is larger and more spinose at the base of the vesical sac than in *monillata* (see figs. 38 and 39).

Philtraea monillata Buckett, n. sp.

(Figs. 3, 16, 17, 18, 30, 39, 48)

Male: Ground color of primaries dorsally white, transverse lines broad, with much yellow, ventrally silghtly off-white. Head with vertex clothed in golden scales and hairs; frons clothed in ochreous-golden scales and hairs; maxillary palpi small, extending to area of anterior tentorial pits, clothed in whitish scales and hairs basally, terminal segment dusky exterolaterally; proboscis very diminutive; antennae with scape and pedicel clothed in white scales, flagellomeres clothed dorsally in white scales, ventrally bipectinate. Thorax with divided collar composed of ochreous elongate hairs and scales, vestiture longest laterally; disc clothed in white scales and hairs; these being easily rubbed off; ventrally clothed in elongate hairs and scales; legs sparsely clothed in white hairs and scales; primaries dorsally with ground color white; transverse lines very broad, represented in yellow, very little to medium amount of dark brown tending lines (as in figs. 16 and 17); transverse anterior line broad, represented costally by two dark brown dots, thence outwardly curving at region of Cu veins and onto inner margin, where line takes an outward jut, outward margin of line composed of dark brown dots between veins; "O" shaped mark colored as in transverse anterior line, equally removed from both transverse lines; transverse posterior line colored as in transverse anterior line, but not taking the outward jut as does transverse anterior line; terminal line represented by dark brown sub-lunules between veins; fringes white; ventral surface off-white, dorsal maculation being visible through surface; secondaries white both dorsally and ventrally. Abdomen clothed dorsally and ventrally in white scales and hairs. Greatest expanse of forewing 15mm. Genitalia as in figs. 30 and 39.

Female: As in male, but with shorter bipectinations than in male; also transverse posterior line on dorsal surface of primaries somewhat narrower; secondaries with terminal line composed of blackish lunules between veins. Greatest expanse of forewing 16mm. Genitalia as in fig. 48.

Larval stage: Unknown

Hostplant: One label states "privet" for the first of the bivoltine generations. Nothing is recorded pertaining to the late summer, or second brood.

Specimens examined: MISSOURI: Holotype male, Barnhart, Jefferson County, 25 June 1935 (E.P. Meiners), Bauer-Buckett slide no. 66B2-23 (in collection American Mueum of Natural History). Paratypes: 1 female (designated allotype) same data as holotype; 6 females, same locality and collector as holotype, 25-27 June 1935; 1 female, same locality and collector as holotype, 15 June 1937; 6 males, 1 female, same locality and collector as holotype, 26 August 1933; 6 males, 4 females, same locality and collector as holotype, 26 August 1937; 1 female, St. Louis City, St. Louis County, "L.P. Anas". TENNESSEE: 1 male, 1 female, Memphis, Shelby County, 18 June 1934, (Guedet Collection) 1 male, Loche, 7 June 1934 (Guedet Collection). LOUISIANA: 1 female, Baton Rouge, East Baton Rouge County, 1 June 1895, (J.B. Smith Colection); 1 male, "La.", label with No. 16070, (Collection Dr. H.G. Dyar), Bauer-Buckett slide no. 67C31-25, (in collection of United States National Museum); 2 males, Baton Rouge, East Baton Rouge County, "bd. privet", 19 June 1913 (E.L. Tucker), Chittenden No. 139; 1 female, same locality as preceding, 3 June 1928, L.S.U. Expt. 246.

This species is somewhat variable in both maculation and size. The latter factor is associated with the second of the bivoltine broods, and can possibly be attributed to the developing larvae in relation to diet nutritional values. Average forewing expanse for the spring brood is ±14mm for males and ±16.35mm for females; whereas, in the summer brood the average forewing expanse is ±11.13mm for males, and ±12.8 mm for females. As can be seen by the figures, there is a great amount of variation in size of this species. The broad "golden" transverse lines will serve, in themselves, to assist in recognition of this species.

It is also interesting to note the distribution of *monillata* (see fig. 3) as it seems to occur only along the Mississippi River and it is the eastern most known species in distribution as is thus far known. This distribution may be used as a diagnostic tool, with considerable reliance.

REFERENCES

BARNES, WM., and J. McDUNNOUGH, 1917. Check list of the Lepidoptera of Boreal America. Herald Press, Decatur, Illinois, 392 + viii pp.

BARNES, WM., and J. McDUNNOUGH, 1918. Notes and new species. *Contrib. Nat. Hist. Lep. N. America* 4(2):61-179 + plates 11-25.

COMSTOCK, J. A., 1934. Studies in Pacific Coast Lepidoptera. *Bull.* S. *Calif. Acad. Sci.* 33:34-48, including 6 plates.

DYAR, H. G., 1903 (1902). A list of North American Lepidoptera and key to the literature of this order of insects. *Bull. U.S. Nat. Mus.* No. 52, xix + 723 pp.

HULST, G. D., 1896. A classification of the Geometrina of North America, with descriptions of new genera and species. *Trans. American Entomol. Soc.* 23:245-386 + plate 10 and 11.

McDUNNOUGH, J. H., 1938. Check list of the Lepidoptera of Canada and the United States of America, part 1. *Mem. S. Calif. Acad. Sci.* 274 pp.

MUNZ, P. A. and D. D. KECK, 1959. A California Flora. Univ. of Calif. Press, Berkeley and Los Angeles, 1681 pp, incl. 134 figures.